



## Coastal CHARM:

### Community Health and Resource Management Model: A Participatory Mapping Tool

Land use planning involves making decisions about what goes where and when. It's how localities shape growth and development patterns for decades to come. Yet, few people, aside from expert professionals, have the tools or information to explore the impacts of these decisions. Coastal CHARM is a new user-friendly mapping tool that enables everyday citizens and local officials to create coastal planning scenarios that are complex and dynamic with results that are instantaneous in terms of a variety of impacts. Coastal CHARM utilizes high-tech software (ESRI ArcGIS<sup>®</sup> and CommunityViz<sup>®</sup>) to provide a low-tech mapping interface, particularly when combined with the weTable. CHARM enables users to access data through maps and apply "paints" that simulate various development types. The Coastal CHARM model then immediately calculates a host of impacts from the painted scenario.

The Coastal CHARM model is changing the way planners engage the public when developing land use plans, hazard plans, and community development plans. Citizens and decision makers alike can now examine geographic data and evaluate the impacts of any number of coastal development scenarios in ways that were previously only accessible to the most GIS-savvy planners.

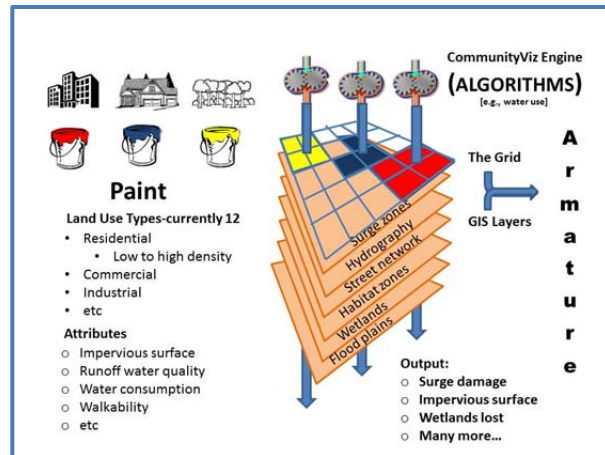
Stakeholders can now ask: What difference will it make if I put a development of 10,000 new homes in a low-density arrangement versus a high-density mixed-use

development? How much population can we accommodate with infill style development and how much will be green field development? For coastal communities, like those along Galveston Bay, what are the tradeoffs that have to be faced in order to accommodate 400,000 people in the next 30 years? Storm surge, stormwater, habitat, land availability, and community life all factor into these impacts. And, these are the kinds of questions facing planners and stakeholders in coastal communities across the country.

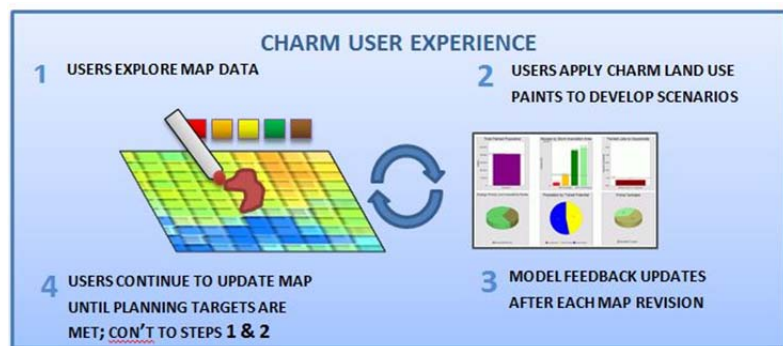


Workshop participants are painting future land uses for the Houston-Galveston region using the CHARM model. The table surface (weTable) is a live digital image and the light pen's position is located through wireless technology. Galveston, TX. 2011.

CHARM is based on simple algorithms that model or quantify development impacts. For example, pollutant loads for different kinds and densities of development have been established. These are known as “event mean concentrations” and values are available in the literature. Similarly, volumetric runoff values are available for development types on different kinds of soils in different parts of the country. Water consumption varies with the size of a lawn. Per capita consumption values are available for specific residential patterns (e.g., townhomes versus large-lot homes) in different climates around the country. The list can go on and on



The CHARM experience begins by users interacting with “reference maps” consisting of GIS data layers for things like aerial photography, wetlands, waterways, storm surge, roads, habitat, soils, agriculture, critical facilities, existing land uses, and census data, among many others. Users gathered around a weTable will typically take an hour or more just discussing the data in these layers in terms of limitations to development. How much weight should be placed on storm surge zones, for example, in terms of limiting development?



Once participants are familiar with the data, they are ready to begin “painting” onto the CHARM map, which consists of 40-acre cells that include data about land characteristics in each cell. Users then apply paints from a pallet of 12 styles representing different development patterns. The CHARM model calculates the impacts of those choices in real-time, updating graphs and charts along the side. Scenarios for growth are built out as users add and remove areas of ‘paint’. The users’ effort results in a map of a future development scenario where its creators can see and evaluate what they’ve proposed in terms of over 40 measurements and calculations, including coastal risks. The key to this tool is that users need have no more skill than how to use a mouse or, if using the weTable, a hand held light pen.